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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,645	11/21/2003	Takefumi Okumura	500.43280X00	9146
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ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873				
			EXAMINER BERNSHTEYN, MICHAEL	
			ART UNIT 1713	PAPER NUMBER

DATE MAILED: 08/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/717,645	Applicant(s) OKUMURA ET AL.	
	Examiner Michael Bernshteyn	Art Unit 1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 1-3 and 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 4-9 and 11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☒ Claim(s) 1-11 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>03/26/2004</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C.

121:

- I. Claims 1-3 and 10, drawn to a polymerizable boron-containing compound for electrochemical device, classified in class 429, subclass 317.
- II. Claims 4-9 and 11, drawn to a polymerizable composition for electrochemical device, classified in class 429, subclass 309.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as mutually exclusive species in an intermediate-final product relationship. Distinctness is proven for claims in this relationship if the intermediate product is useful to make other than the final product, and the species are patentably distinct (MPEP § 806.05(j)). In the instant case, the intermediate product is deemed to be useful as a polymerizable boron-containing compound for electrochemical device and the inventions are deemed patentably distinct because there is nothing on this record to show them to be obvious variants.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Art Unit: 1713

4. Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.
5. During a telephone conversation with Mr. William I. Solomon on July 28, 2006 a provisional election was made with traverse to prosecute the invention of Group II, claims 4-9 and 11. Affirmation of this election should be made by applicant in replying to this Office action. Claims 1-3 and 10 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to non-elected invention.
6. Claims 4-9 and 11 are active in the Application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1713

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

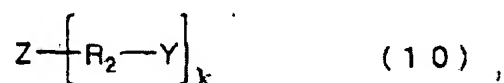
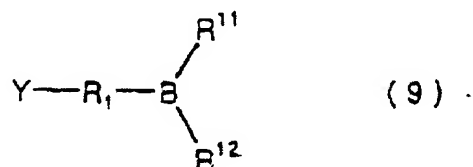
This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 4-9 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishiura (EP 1 160 268 A1).

With regard to the limitations of claims 4-7, Nishiura discloses a polymeric electrolyte, which is improved in a transport rate of charge carrier ions by containing a boron atom containing polymeric compound and an electric device using the same (abstract).

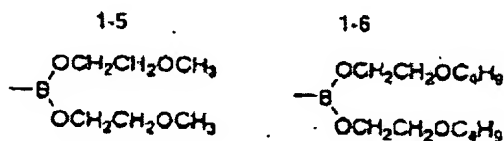
Art Unit: 1713

The third ion-conductive polymeric compound can be obtained by polymerizing a mixture of compounds represented by the following general formulas (9) and (10), which are substantially identical to the claimed formulas (2) and (3) (page 6, [0035]):



The mixing ratio of the compound represented by formulas (9) and (10) is 1/99 to 99/1 in terms of weight ratio, which is within the claimed range (page 6, [0037]).

In the above formulas Y represents a polymerizable functional group. Preferable examples thereof include a (meth)acrylic residue, an allyl group and a vinyl group (pages 6-7, [0039]). Many examples of R^{11} and R^{12} were described on pages 7-9, [0040]-[0043], and include the following:



With regard to the limitations of claims 8-9 and 11, Nishiura discloses that the polymeric electrolyte comprises one or more of the ion-conductive polymeric

Art Unit: 1713

compounds, and an electrolytic salt. The electrolytic salt is not particularly limited. A lithium salt is preferably used. Examples thereof include LiBF_4 , LiPF_6 , LiClO_4 , LiAsF_6 , LiCF_3SO_3 , $\text{LiN}(\text{CF}_3\text{SO}_2)_2$, $\text{LiN}(\text{C}_2\text{F}_5\text{O}_2)_2$, $\text{LiC}(\text{CF}_3\text{SO}_2)_3$, LiCl , LiF , LiBr , LiI , derivatives thereof and the like. These lithium salts can be used either singly or in combination (page 10, [0055]-[0056]).

8. Claims 4-9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokoyama et al. (WO 01/39316). The U. S. Patent 6,833,220 is equivalent to the WO 01/39316 therefore the following rejection is based upon the U. S. Patent 6,833,220.

Yokoyama discloses an electrolyte for secondary battery comprising an ionic compound and an organic polymer compound, wherein the organic polymer compound comprises a compound represented by the general formula (1) or a boric acid ester compound obtained by the esterification of the compound represented by the general formula (1) with boric acid or boric anhydride:



wherein Z_1 represents a residue of compound having from 1 to 6 hydroxyl groups; A^1O represents one or a mixture of two or more of $\text{C}_2 - \text{C}_4$ oxyalkylene groups; R^1 represents a group selected from the group consisting of cyanoethyl group, $\text{C}_1 - \text{C}_{12}$ hydrocarbon group and hydrogen atom; 1 represents an integer of from 0 to 600; and the suffix a represents an integer of from 1 to 6, with the proviso that $1a$ ranges from 0 to 600, and a secondary battery comprising the electrolyte for secondary battery (abstract).

Art Unit: 1713

With regard to the limitations of claims 4-7, Yokoyama discloses an electrolyte for secondary battery comprising an ionic compound and an organic polymer compound, wherein the organic polymer compound comprises a polymerization product of a compound represented by the general formula (2) or a polymerization product of a boric acid ester compound obtained by the esterification of the compound represented by the general formula (2) with boric acid or boric anhydride (col. 2, line 50 through col. 3, line 39):



wherein Z^2 represents a residue of compound having from 1 to 4 hydroxyl groups; A^2O represents one or a mixture of two or more of $C_2 - C_4$ oxyalkylene groups; m represents an integer of from 0 to 150; b represents an integer of from 1 to 4, with the proviso that mb ranges from 0 to 300; and $R^{sup.2}$ represents a hydrogen atom, cyanoethyl group or a group represented by the general formula (3):



wherein R^3 and R^4 each represent a hydrogen atom or methyl group.

Yokoyama also discloses the electrolyte for secondary battery, wherein the organic polymer compound further comprises a polymerization product of a compound represented by the general formula (4):



Art Unit: 1713

wherein Z^3 represents a residue of compound having from 1 to 4 hydroxyl groups; A^3O represents one or a mixture of two or more of $C_2 - C_4$ oxyalkylene groups; n represents an integer of from 0 to 150; c represents an integer of from 1 to 4, with the proviso that nc ranges from 0 to 300; and R represents a hydrogen atom or a group represented by the general formula (5):



In the general formulae (1), (2) and (4), the $C_2 - C_4$ oxyalkylene groups represented by A^1O , A^2O and A^3O include oxyethylene group, oxypropylene group, oxybutylene group, and oxytetramethylene group. Preferred among these oxyalkylene groups are oxyethylene group and oxypropylene group. **These oxyalkylene groups may be used singly or in admixture of two or more thereof.** The polymerization of two or more of these oxyalkylene groups may be accomplished by either block polymerization process or random polymerization process (col. 4, lines 58-67).

In the case of the boric acid ester compound obtained by the esterification of a compound represented by the general formula (2) with boric acid or boric anhydride, at least one of R^2 is a hydrogen atom. Preferably, all R^2 each are a hydrogen atom (col. 5, lines 18-23).

In the groups represented by the general formulae (3) and (5), R^3 , R^4 , R^6 and R^7 each are a hydrogen atom or methyl group. The groups represented by the general formula (3) and (5) each are preferably an **acryloyl group** wherein R^3 , R^4 , R^6 and R^7 each are a hydrogen atom, respectively. Alternatively, the

Art Unit: 1713

groups represented by the general formula (3) and (5) each are preferably a **methacryloyl group** wherein R^3 and R^6 each are a hydrogen group and R^4 and R^7 each are a methyl group (col. 5, lines 32-40).

The polymerization product of a compound represented by the general formula (2) or (4) is a product of polymerization of polymerizable group, which is a residue of polymerizable group-containing compound such as acrylic acid, methacrylic acid and crotonic acid. The compound represented by the general formula (2) or (4) has at least one polymerizable group. In some detail, when Z^2 and Z^3 each are not a residue of polymerizable group-containing compound such as acrylic acid, methacrylic acid and crotonic acid, at least one of R^2 and R^5 has a polymerizable group represented by the general formula (3) or (5) (col. 5, lines 42-52).

The compounds represented by the general formulae (1), (2), (4) and (6) can be obtained by a ring opening polymerization process which has heretofore been known. These compounds can be synthesized, e.g., by polymerizing a compound having a hydroxyl group with a C_2 – C_4 alkylene oxide such as ethylene oxide, propylene oxide, butylene oxide and tetrahydrofuran at a predetermined molar ratio in the presence of a ring opening polymerization catalyst such as alkaline metal salt (e.g., potassium hydroxide, lithium hydroxide, sodium methylate) and Lewis acid (e.g., boron trifluoride etherate, tin tetrachloride, aluminum trioxide) (col. 6, lines 38-50).

Yokoyama discloses that the compounds represented by the general formula (2) or (4) maybe used **singly or in combination of two or more thereof**

Art Unit: 1713

for the purpose of providing good mechanical properties (col. 7, lines 52-54 and col. 10, lines 58-65). The polymerizable group contained in the compound represented by the general formula (2) or (4) is polymerized before the use of the compound. The polymerization of the polymerizable group is accomplished by the use of energy such as heat, ultraviolet ray, visible light and electron beam. The polymerization may be effected optionally in the presence of a polymerization initiator, which has heretofore been known (col. 7, lines 55-60).

The boric acid ester compounds derived from the general formula (1) may be used **singly or in admixture** preferably in an amount of from 5 to 95 parts by weight, more preferably from 10 to 80 parts by weight for the purpose of providing flexibility characteristic to polymer electrolyte (col. 8, lines 5-11).

"It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art." **In re Kerkhoven**, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980)

(citations omitted) (Claims to a process of preparing a spray-dried detergent by mixing together two conventional spray-dried detergents were held to be *prima facie* obvious.). See also **In re Crockett**, 279 F.2d 274, 126 USPQ 186 (CCPA 1960) (Claims directed to a method and material for treating cast iron using a mixture comprising calcium carbide and magnesium oxide were held unpatentable over prior art disclosures that the aforementioned components individually promote the formation of a nodular structure in cast iron.); and *Ex*

Art Unit: 1713

parte Quadranti, 25 USPQ2d 1071 (Bd. Pat. App. & Inter. 1992) (mixture of two known herbicides held prima facie obvious).

It is noted that the amount of the molar ratio of the components A and B is a result effective variable, and therefore, it is within the skill of those skilled in the art to find the optimum value of a result effective variable, as per *In re Boesch and Slaney* 205 USPQ 215 (CCPA 1980). See also *Peterson*, 315 F.3d at 1330, 65 USPQ2d at 1382: "The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."

With regard to the limitations of claims 8-9 and 11, Yokoyama discloses that examples of the ionic compound employable herein include alkaline metal salts such as LiClO₄, LiAsF₆, LiPF₅, LiBF₄, LiCF₃SO₃, Li(CF₃SO₂)₂N, Li(C₂F₅SO₂)₂N, Li(CF₃SO₂)₃C, LiI, LiSCN, NaBr, NaI, NaSCN, KI and KSCN. Preferred among these alkaline metal salts are lithium salts such as LiClO₄, LiAsF₆, LiPF₆, LiBF₄, LiCF₃SO₃, Li(CF₃SO₂)₂N, Li(C₂F₅O₂)₂N, Li(CF₃SO₂)₃C, LiI and LiSCN (col/ 11, lines 17-23).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Bernshteyn whose telephone number is 571-272-2411. The examiner can normally be reached on M-F 8-5:30.

Art Unit: 1713

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael Bernshteyn
Patent Examiner
AU 1713

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08/10/2006



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